

CLAIMS

5        1. A transfer assembly for transporting and applying a discrete part to a moving web, the discrete part having varying thickness, the carrier comprising:

10              a carrier body having a discrete part engaging outer surface, the outer surface including a generally concave top portion and a generally concave recessed portion spaced inwardly from said top surface; said top portion adapted and configured to engage a first portion of a discrete part having a first thickness, said recessed portion adapted and configured to engage at least one portion of the discrete part having at least one thickness greater than said first thickness.

15        2. The transfer assembly of claim 1, wherein said recessed portion is located generally centrally in said outer surface.

20        3. The transfer assembly of claim 1, wherein said recessed portion has a generally hour-glass shape.

25        4. The transfer assembly of claim 1, wherein said recessed portion has a generally rectangular shape.

5        5. The transfer assembly of claim 1, further comprising at least one aperture in said outer surface and extending through said carrier body for communication with a vacuum source.

30        6. The transfer assembly of claim 1 further comprising a carrier base adapted to support said carrier body.

7. The transfer assembly of claim 1 wherein said outer surface has a surface roughness of at least 3 micrometers.

5 8. The transfer assembly of claim 1 wherein said outer surface includes a plasma coating thereon.

10 9. An apparatus for applying discrete parts onto a substrate web, the apparatus comprising:

- 15 a) a web conveyor adapted to support and advance a substrate web;
- b) at least one transfer assembly configured to rotate about an axis and which includes an outer surface configured to engage a discrete part, said at least one transfer assembly spaced from said web conveyor such that the discrete part may be applied to said substrate web, said outer surface including at least one recessed portion for engaging at least one portion of the discrete part that is relatively thicker than other portions of the discrete part.

20 10. The apparatus of claim 9, wherein said at outer surface of said at least one transfer assembly includes a top surface having a generally concave shape.

25 11. The apparatus of claim 10, wherein said web conveyor is spaced from said top surface of said at least one transfer assembly a distance less than the combined total thickness of the substrate web and the discrete part.

30 12. The apparatus of claim 9, wherein said at least one transfer assembly and said web conveyor are arranged such that at least 80% of a surface of the discrete part contacts an opposing surface of the substrate web during the rotation of said at least one transfer assembly about the axis.

13. The apparatus of claim 9, wherein said at least one transfer assembly and said web conveyor are arranged such that at least 90% of a surface of the discrete part contacts an opposing surface of the substrate web

5 14. The apparatus of claim 9, wherein said at least one transfer assembly and said web conveyor are arranged such that at least 95% of a surface of the discrete part contacts an opposing surface of the substrate web

10+ 15. An apparatus for applying discrete parts onto a substrate web, the apparatus comprising:

15 16. a) at least one transfer assembly configured to rotate about an axis and which includes an outer surface configured to engage the discrete parts, and

20 b) a web conveyor having an outer surface adapted to support and advance a substrate web, said web conveyor spaced from said outer surface of said at least one transfer assembly, said outer surface of said web conveyor including at least one recessed portion for engaging at least one portion of each of the discrete parts that is relatively thicker than other portions of each of the discrete parts.

25 17. The apparatus of claim 15, wherein said web conveyor is spaced from said at least one transfer assembly a distance less than the combined total thickness of the substrate web and the discrete part.

30 18. An apparatus for applying discrete parts having a varying thickness onto a second substrate web traveling at a second speed, said apparatus comprising:

a) a web conveyor adapted to support and advance a substrate web;

b) at least one transfer assembly configured to rotate about a first axis, said transfer assembly including an outer surface which is configured to transport said discrete parts and apply said discrete parts to said substrate

web; said outer surface including at least one recessed portion for engaging at least one portion of the discrete parts that is relatively thicker than other portions of the discrete parts;

- 5           c)     a drive member which is configured to rotate about a second axis which is offset from said first axis of said transfer assembly;
- 10           d)     at least one coupler arm which is pivotally connected to said drive member about a pivot point, said coupler arm including a cam end which is configured to follow a curvilinear path and a crank end which is slidably connected to said transfer assembly; and
- 15           e)     a drive mechanism adapted to rotate said drive member about said second axis wherein, as said drive member is rotated, said cam end of said coupler arm is guided along said curvilinear path and said crank end of said coupler arm slidably engages said transfer assembly thereby pivoting said coupler arm about said pivot point to vary an effective drive radius of said transfer assembly and rotate said transfer assembly at a variable speed.

20           18.    The apparatus of claim 17 wherein said transfer assembly is configured to maintain a substantially constant surface speed as the discrete parts are received and a substantially constant second speed as the discrete parts are applied to said substrate web.

25           19.    The apparatus of claim 17 wherein said first surface speed of said transfer assembly is substantially equal to said first speed of said first substrate web and said second surface speed of said transfer assembly is substantially equal to said second speed of said second substrate web.

30           20.    The apparatus of claim 17, further comprising a turning mechanism adapted to rotate said at least one transfer assembly before the discrete parts are applied to said second substrate web.